AMENDMENTS TO THE CLAIMS

1. (Previously presented) A method of detecting gas leaks, the method comprising the steps of:

traversing a target area with a gas filter correlation radiometer having a field of view oriented towards the target area, the gas filter correlation radiometer being tuned to detect ethane; and

identifying a gas leak upon the gas filter correlation radiometer detecting the presence of ethane by detecting variations in solar radiation reflected from the target area.

2. (Original) The method of claim 1 in which the gas filter correlation radiometer is tuned to detect ethane using an ethane absorption peak at 3000 cm^{-1}.

3. (Previously presented) The method of claim 1 in which the gas filter correlation radiometer is tuned to detect ethane using an ethane absorption peak at a bandwidth of 2850 to 3075 cm^{-1}.

4. (Original) The method of claim 1 in which the gas filter correlation radiometer is tuned to detect ethane using an ethane absorption peak at a bandwidth up to 150 cm^{-1} above or below 3000 cm^{-1}.

5. (Currently amended) The method of claim 1 in which the gas filter correlation radiometer comprises:

a window in a housing;

optics defining a first optical path and a second optical path between the window and a detector section mounted in the housing;

a bi-prism beam splitter mounted in the housing as part of the optics for directing radiation entering the window from an outside source along two divergent paths offset from each other to divide the radiation between the first optical path and the second optical path;

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the first optical path having a first ethane path length and the second optical path having a second ethane path length, the first ethane path length being different from the second ethane path length; and

electronics for processing signals produced by the detector section as a result of radiation being directed by the optics onto the detector section.

6. (Currently amended) The method of claim 5 in which the bi-prism beam splitter comprises a bi-prism formed of a pair of wedges, each wedge having a thinner side and a thicker side, the pair of wedges being joined along the respective thinner sides.

7. (Original) The method of claim 5 in which the gas filter correlation radiometer is tuned to detect ethane using an ethane absorption peak at 3000 cm^{-1}.

8. (Original) The method of claim 5 in which the gas filter correlation radiometer is tuned to detect ethane using an ethane absorption peak at a bandwidth of 2850 to 3075 cm^{-1}.

9. (Original) The method of claim 5 in which the gas filter correlation radiometer is tuned to detect ethane using an ethane absorption peak at a bandwidth up to 150 cm^{-1} above or below 3000 cm^{-1}.

10. (Original) The method of claim 6 in which the gas filter correlation radiometer is tuned to detect ethane using the ethane absorption peak at 3000 cm^{-1} by incorporating a filter in the optics that selects radiation in a passband that includes the ethane absorption peak at 3000 cm^{-1}.

11. (Original) The method of claim 5 in which the first optical path is provided with an ethane path length by incorporation into the first optical path of a gas filter containing ethane.

12. (Original) The method of claim 11 in which the second ethane path length is lower than the first ethane path length.

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13. (Original) The method of claim 5 in which the detector section further comprises:

a first detector on the first optical path and a second detector on the second optical path, and corresponding pixels on the first detector and second detector having collocated fields of view and being sampled synchronously.

14. (Previously presented) The method of claim 5 in which the detector section detects radiation using a pushbroom imaging technique, in which pixels in an array of pixels in the detector section are sampled simultaneously.

15. (Original) The method of claim 1 in which the gas filter correlation radiometer is mounted in an aircraft.

16. (Previously presented) The method of claim 1 in which the gas leak is located along a pipeline, and detection of the gas leak is carried out only using detection of ethane.

17. (Original) The method of claim 1 in which the gas leak is detected as part of a reservoir mapping process.

18. (Currently amended) A gas filter correlation radiometer, comprising:

a window in a housing;

optics defining a first optical path and a second optical path between the window and a detector section mounted in the housing;

a bi-prism beam splitter mounted in the housing as part of the optics for directing radiation entering the window from an outside source along two divergent paths offset from each other through the bi-prism beam splitter to divide the radiation between the first optical path and the second optical path;

the first optical path having a first gas path length and the second optical path having a second gas path length, the first gas path length being different from the second gas path length; and

electronics for processing signals produced by the detector section as a result of radiation being directed by the optics onto the detector section.

19. (Canceled)

20. (Original) The gas filter correlation radiometer of claim 18 in which the gas filter correlation radiometer is tuned to detect ethane using the ethane absorption peak at 3000 cm^{-1}.

21. (Previously presented) A gas filter correlation radiometer, comprising:

a window in a housing;

optics defining a first optical path and a second optical path between the window and a detector section mounted in the housing;

a beam splitter mounted in the housing as part of the optics for directing radiation entering the window from an outside source to divide the radiation between the first optical path and the second optical path;

the first optical path having a first gas path length and the second optical path having a second gas path length, the first gas path length being different from the second gas path length; and

electronics for processing signals produced by the detector section as a result of radiation being directed by the optics onto the detector section, the gas filter correlation radiometer being tuned to detect ethane using an ethane absorption peak at a bandwidth of at least 2850 to 3075 cm^{-1}.

22. (Previously presented) The gas filter correlation radiometer of claim 21 in which the gas filter correlation radiometer is tuned to detect ethane using an ethane absorption peak at a bandwidth up to 150 cm^{-1} above or below 3000 cm^{-1}.

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23. (Previously presented) The gas filter correlation radiometer of claim 21 in which the gas filter correlation radiometer is tuned to detect ethane using the ethane absorption peak at 2850 to 3075 cm^{-1} by incorporating a filter in the optics that selects radiation in a passband that includes the ethane absorption peak at 2850 to 3075 cm^{-1}.

24. (Original) The gas filter correlation radiometer of claim 18 in which the first optical path incorporates a gas filter containing ethane.

25. (Original) The gas filter correlation radiometer of claim 24 in which the second gas path length is lower than the first gas path length.

26-31. (Canceled)

32. (New) The gas filter correlation radiometer of claim 18 in which the bi-prism beam splitter comprises a bi-prism formed of a pair of wedges, each wedge having a thinner side and a thicker side, the pair of wedges being joined along the respective thinner sides.

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